

SEMICONDUCTOR STRUCTURES AND MANUFACTURING METHODSAbstract of the Disclosure

A method for forming substantially uniformly thick, thermally grown, silicon dioxide material on a silicon body independent of bon axis. A trench is formed in a surface of the silicon body, such trench having sidewalls disposed in different crystallographic planes, one of such planes being the <100> crystallographic plane and another one of such planes being the <110> plane. A substantially uniform layer of silicon nitride is formed on the sidewalls. The trench, with the with substantially uniform layer of silicon nitride, is subjected to a silicon oxidation environment with sidewalls in the <110> plane being oxidized at a higher rate than sidewalls in the <100> plane producing silicon dioxide on the silicon nitride layer having thickness over the <110> plane greater than over the <100> plane. The silicon dioxide is subjected to an etch to selectively remove silicon dioxide while leaving substantially un-etched silicon nitride to thereby remove portions of the silicon dioxide over the <100> plane and to thereby expose underlying portions of the silicon nitride material while leaving portions of the silicon dioxide over the <110> plane on underlying portions of the silicon nitride material. Exposed portions of the silicon nitride material are selectively removed to expose underlying portions of the sidewalls of the trench disposed in the <100> plane while leaving substantially un-etched portions of the silicon nitride material disposed on sidewalls of the trench disposed in the <110> plane. The structure is then subjected to an silicon oxidation environment to produce the substantially uniform silicon dioxide layer on the sidewalls of the trench.